

CLAIMS

1. An electronic circuit (1) provided with a piezoelectric transformer (100) for driving an electronic component (19), in which circuit the transformer (100) comprises a primary plate (4) and a secondary plate (8) made from a piezoelectric material, together with an intermediate insulating layer (6) interposed between the primary and secondary plates (4, 8), the primary plate (4) being arranged to transmit a displacement signal to the secondary plate (8) through the intermediate layer (6) in response to a primary signal that is transmitted to the primary plate via the electronic circuit, and the secondary plate (8) delivering a secondary signal to the electronic component (19) as a function of the primary signal for the purpose of driving the electronic component (19) to which the secondary plate (8) is connected,

the circuit being characterized by the fact that it comprises a first layer (2) in which the primary plate (4) is integrated and a second layer in which the secondary plate (8) is integrated, the first and second layers (2, 5) being galvanically isolated from each other by the intermediate layer (6).

2. An electronic circuit according to claim 1, in which the first and second layers (2, 5) are constituted by a substrate of a material selected from printed circuit material, ceramic material, and semiconductor material, and each supporting one printed circuit face, the primary and secondary plates (4, 8) being fastened in recesses (13) previously formed in each of the layers respectively.

3. An electronic circuit according to claim 2, in which at least one conductive layer (6a) is interposed between the first and second layers (2, 5).

4. An electronic circuit according to any preceding claim, in which the electronic component (19) is a power transistor integrated in the second layer (5) and having a gate receiving the secondary signal.

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5. An electronic circuit according to any preceding claim, the first layer (2) having a primary circuit (PRIM) comprising a modulator (MOD) connected to the primary plate (4) and adapted to form the primary signal with at least one carrier signal being modulated by a drive signal (SIG), and to deliver the primary signal as formed in this way to the primary plate (4); and the second layer (5) having a secondary circuit (SEC) comprising a demodulator (DEM) connected between the secondary plate (8) and the electronic component (19), and adapted to transmit to said electronic component (19) a signal demodulated from the secondary signal corresponding to the drive signal.

6. An electronic circuit according to claim 5, in which the secondary circuit (SEC) further comprises a rectifier device (10) connected between the secondary plate (8) and the demodulator (DEM), and adapted to rectify the secondary signal delivered by the secondary plate (8).

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7. An electronic circuit according to claim 5 or claim 6, in which the secondary circuit (SEC) further comprises a locking device (VER) connected between the demodulator (DEM) and the electronic component (19) and adapted to deliver a reliable demodulated signal to the electronic component (19).

8. An electronic circuit according to any one of claims 5 to 7, comprising an oscillator (OSC) adapted to deliver the carrier signal to the modulator (MOD) at a frequency that is close to a mechanical resonant frequency (f_R) of the transformer (100).

9. An electronic circuit according to claim 8, in which the oscillator (OSC) is adapted to deliver a carrier signal at a frequency close to the frequency of the
5 second resonant mode of vibration of the transformer (100).

10. An electronic circuit according to any preceding claim, in which the primary and secondary plates (4, 8)
10 are made out of a piezoelectric material that is biased in thickness.

11. An electronic circuit according to any preceding claim, in which the electronic component (19) is a MOSFET
15 or an IGBT.

12. An electronic circuit according to any preceding claim, further comprising an additional piezoelectric primary plate integrated in the first layer (2), and an
20 additional piezoelectric secondary plate integrated in the second layer (5) and connected to an additional electronic component (19), the electronic component (19) being connected to form a complete arm of a bridge.